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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,453	10/15/2003	Yasutomo Yamamoto	500.35346CX3	8847

20457 7590 09/02/2004

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EXAMINER

BRAGDON, REGINALD GLENWOOD

ART UNIT PAPER NUMBER

2188

DATE MAILED: 09/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/684,453

Applicant(s)

YAMAMOTO ET AL.

Examiner

Reginald G. Bragdon

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 08/833,347.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 08/833,347, filed on 04 April 1997.

Information Disclosure Statement

2. The Information Disclosure Statement received 15 October 2003 has been considered except as noted below.
3. European document 07084732 submitted on the IDS has been crossed off the PTO-1449 since this is an English language abstract corresponding to the Japanese document 07-84732 also submitted in the IDS.

Drawings

4. The drawings filed on 15 October 2003 have been approved by the Examiner.

Specification

5. Applicant is requested to update any data (continuation serial number, patent number, etc...) concerning co-pending or related applications listed in the specification.

The status of the parent applications on page 1 should be updated as appropriate.

Claim Objections

6. Claims 8-9 and 14-22 are objected to because of the following informalities:

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As per claim 8, lines 1-2, "one or plural first physical disk devices" should be --at least one first physical device--.

As per claim 8, line 2, "configure" should be --is configured as a--.

As per claim 8, line 3, "one or plural second physical disk devices" should be --at least one second physical device--.

As per claim 8, line 3, "configure" should be --is configured as a--.

As per claim 9, lines 1-2, "one or plural first physical disk devices" should be --at least one first physical device--.

As per claim 9, line 2, "configure" should be --is configured as a--.

As per claim 9, line 3, "one or plural second physical disk devices" should be --at least one second physical device--.

As per claim 9, line 3, "configure" should be --is configured as a--.

As per claim 14, line 3, "one or plural second physical disk devices" should be --at least one second physical device--.

As per claim 15, line 4, "devices" should be --device--.

As per claim 16, line 4, "devices" should be --device--.

As per claim 18, line 6, "processing" should be --processor--.

As per claim 18, line 13, "is" should be --are--.

As per claim 19, line 3, "processing" should be --processor--.

As per claim 19, line 5, "one or plural physical disk devices" should be --at least one physical disk device--.

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All dependent claims are objected to as having the same deficiencies as the claims they depend from.

Appropriate correction is required.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 10-13 and 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, and 7 of U.S. Patent No. 5,956,750. Although the conflicting claims are not identical, they are not patentably distinct from each other because the removal of an element and subsequent loss of function would have been obvious to one of ordinary skill in the art.

Claim 10 of the present application corresponds to claim 1 of the '750 patent, where the step of "referring" in claim 10 corresponds to the "according to results of the calculating step" limitation of claim 1, the step of "determining" corresponds to lines 11-15 of claim 1, and the step of "reallocating" corresponds to the step of "reallocating" in claim 1 of the '750 patent.

Claim 11 of the present application corresponds to lines 3-4 of claim 1 of the '750 patent.

Claim 12 of the present application corresponds to claim 3 of the '750 patent.

Claim 13, of the present application corresponds to claim 3, lines 3-5, of the '750 patent.

Claim 18 of the present application corresponds to claim 7 of the '750 patent, where the step of "referring" in claim 18 corresponds to the "according to results of the calculating means" limitation of claim 7, the step of "determining" corresponds to lines 10-15 of claim 7, and the step of "reallocating" corresponds to the step of "reallocating means" in claim 7 of the '750 patent.

9. Claims 1-3 and 5-6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of U.S. Patent No. 5,956,750 in view of Jacobson et al.

As per claims 1 and 5-6, Claim 7 of the '750 patent teaches the limitations of the as set forth for claim 18, above. However, claim 7 does not set forth "updating correlation between logical disk devices and physical disk devices". Jacobson et al. teaches mapping of the virtual blocks via a virtual block table, which is modified when a virtual block is transferred between the RAID arrays. See column 6, lines 67-68, and column 8, lines 19-20. It would have been obvious to one of ordinary skill in the art to have modified claim 7 of the '750 patent to update the correlation between logical disk devices and physical disk devices, as suggested by Jacobson et al., in order to maintain system efficiency by allowing applications to find relocated data on a different physical disk.

Claim 2 corresponds to lines 11-12 of claim 7 of the '750 patent.

Claim 3 corresponds to lines 13-15 of claim 7 of the '750 patent.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-3, 5-15, and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacobson et al. (5,392,244).

As per claims 1, 7-11, 13-15, 18, and 20, Jacobson et al. teaches a RAID system including disks organized as a RAID 1 array of disks 18 (“at least one first physical device”) and a RAID 5 array of disks 22 (“at least one second physical device”) and a disk array controller 15 (“controller”), where data is consecutively allocated on the disks. See figures 1 and 4. The RAID management system 16 determines which data should be migrated from one virtual storage space (e.g. RAID 1) to another virtual storage space (e.g. RAID 5). See column 4, lines 44-60. More frequently or recently accessed data is kept on the RAID 1 disks 18, while less frequently or recently accessed data is kept on the RAID 5 array of disks (“referring to access information...”). See column 4, line 61, to column 5, line 7. When a first virtual block (e.g. “logical disk”) of a parity RAID level is selected for migration, the data is transferred to an allocation block (e.g. on another physical disk) of the RAID 1 level (“determining... a second logical disk device...”). See column 6, line 42 to column 7, line 10. In a similar manner, when a second virtual block of a RAID 1 level is selected for migration, the data is transferred to an allocation block of the RAID 5 level (“determining... a first logical disk device...”). See column 7, line 65, to column 8, line 25.

Therefore Jacobson et al. teaches transferring data of a first logical disk device (e.g. a virtual block of a RAID 1 array) from a first physical disk (e.g. disk 1) to a second physical disk (e.g. disk 0). Furthermore, data of a second logical disk device (e.g. a virtual block of a RAID 5 array) is transferred from a second physical disk (e.g. disk 0) to a first physical disk (e.g. disk 1). It is noted that the claim language does not require that the transferring between the first disk and the second disk occur at the same time as the transferring of data between the second disk and the first disk.

As per claim 1, Jacobson et al. teaches mapping of the virtual blocks via a virtual block table, which is modified when a virtual block is transferred between the RAID arrays. See column 6, lines 67-68, and column 8, lines 19-20. The virtual block table would be used to determine where to access the virtual block on the array of disks.

As per claims 2-3, Jacobson et al. teaches migrating data from RAID 5 to RAID 1 based on frequency of access, where inherently a predetermined threshold must be established as a trigger as to when data must be migrated from RAID 5 to RAID 1.

As per claims 5-6, 12, and 19, Jacobson et al. teaches mapping of the virtual blocks via a virtual block table, which is modified when a virtual block is transferred between the RAID arrays. See column 6, lines 67-68, and column 8, lines 19-20. The virtual block table would be used to determine where to access the virtual block on the array of disks (claims 12 and 19, step of "deciding").

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 4, 16-17, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson et al in view of Schultz et al. (5,809,224).

As per claims 4, 16-17, and 21-22, Jacobson et al. does not teach a memory device for transferring data between the disks. Schultz et al. teaches utilizing a cache memory for transferring data between disks. See column 8, lines 35-42. It would have been obvious to utilize a cache memory when transferring data between the disk of Jacobson et al, as suggested by Schultz et al., because this would provide for the efficient timing of the transfer, thereby preventing transfer errors.

Response to Arguments

14. Applicant's arguments filed 15 October 2003 have been fully considered but they are not persuasive.

Applicant sets forth in the "preliminary response" that "claims of the present application recite features which were acknowledged by the Examiner in the parent application as being distinguishable over the prior art of record. However, Applicant should provide arguments pointing out the specific distinctions [i.e. specific claim limitations] believed to render the

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claims, including any newly presented claims, patentable over any [previously] applied references, as set forth in 37 CFR 1.111.

Conclusion

15. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

All "OFFICIAL" patent application related correspondence transmitted by FAX must be directed to the central FAX number at (703) 872-9306:

"INFORMAL" or "DRAFT" FAX communications may be sent to the Examiner at (703) 746-5693, only after approval by the Examiner.

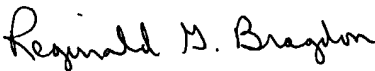
Hand-delivered responses should be brought to Crystal Park II, 2121
Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald G. Bragdon whose telephone number is (703) 305-3823. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM and every other Friday from 7:00 AM to 3:30 PM.

The examiner's supervisor, Mano Padmanabhan, can be reached at (703) 306-2903.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

RGB
September 1, 2004


Reginald G. Bragdon
Primary Patent Examiner
Art Unit 2188